THE NAVY & MARINE CORPS AVIATION SAFETY MAGAZINE

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Approach

Weather:

One of the most important factors affecting aviation safety and the mission.

The Navy & Marine Corps Aviation Safety Magazine
January-February 2008, Volume 53 No. 1

Mishaps waste our time and resources. They take our Sailors, Marines and civilian employees away from their units and workplaces and put them in hospitals, wheelchairs and coffins. Mishaps ruin equipment and weapons. They diminish our readiness. This magazine's goal is to help make sure that personnel can devote their time and energy to the mission, and that any losses are due to enemy action, not to our own errors, shortcuts or failure to manage risk. We believe there is only one way to do any task: the way that follows the rules and takes precautions against hazards. Combat is hazardous enough; the time to learn to do a job right is before combat starts.

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Photo composite image by Allan Amen.

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Bird Animal Strike Hazard (BASH)
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Aviation Data
http://www.safetycenter.navy.mil/aviation/aviationdata/default.htm
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Statistics
http://www.safetycenter.navy.mil/statistics/default.htm

Additional Resources

Naval Aviation Safety Programs (OPNAVINST 3750.6R)
http://www.safetycenter.navy.mil/instructions/aviation/opnav3750/
default.htm

Command Safety Assessments
www.safetyclimatesurveys.org
Dr. Bob Figlock (888) 603-3170
surveys@adnancedsurveydesign.com

School of Aviation Safety (ASO, ASC, and CRM Curricula)
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Navy Forecasters
Providing Weather Services Online

By LTJG Erin Ceschini and George Lammons

Navy forecasters have predicted the weather for naval air operations for nearly 90 years. The forecasters in Norfolk have operated from the same building for nearly half that amount of time. However, change is the key word in today's weather forecasting, and the Norfolk office is just part of that effort.

The Naval Aviation Forecast Center Norfolk (NAFC) is a new command, with a new organizational structure and a new responsibility. For aviators, NAFC still is the place where the Navy weather forecasters work.

"We haven't stopped forecasting aviation weather," said Cdr. Nick Cipriano, NAFC commanding officer, "but, we have changed our request process and delivery method."

Pilots can request an en-route, flight-weather forecast (DD-175-1) from NAFC, using the web, via Flight Weather Briefer (FWB). The NATOPS 3710.7T fully supports FWB, and it is the preferred method to request and receive a DD-175-1. For pilots without computer or PKI access, NAFC and the Naval Aviation Forecast Detachments (NAFDs) accept phone and fax requests.

"We don't have an in-person, local forecaster's brief every flight, but formulation of the weather forecast has not changed," Cipriano said. "Also, we encourage pilots to call the forecasters at NAFC and the NAFDs for supplemental information and additional guidance as necessary."

In addition to these flight-weather forecasts, NAFC provides terminal-aerodrome forecasts (TAFs) and weather warnings to 22 continental United States (CONUS) naval air stations. The forecasters at NAFC issue weather warnings to notify airfields and bases of such things as thunderstorms, high winds, and severe winter weather that may affect operations.

The center was established in January 2005 to centralize CONUS services for naval-aviation weather and resource-protection forecasts. The new center is a key part of a comprehensive transformation in the naval oceanography program. Concurrently, manning at naval-air stations across the United States was drawn down to weather observers on 16 of 22 airfields. To meet operational tempo and mitigate risk, two master jet bases (Oceana and Lemoore) and three large training airfields (Corpus Christi, Pensacola and Whiting Field), along with NAS Whidbey Island, have retained weekday, daytime, on-site forecasting services.

Centralizing resources at NAFC fully supports shore-based, naval-aviation forecasting. This new organization uses 60 percent fewer Sailors, supports CNO-directed manpower cuts, and frees resources to enable Navy METOC warfighting support of the Global War on Terror.

Similar efforts to consolidate forecast services into a central hub already have been completed in Asia and Europe. The NAFDs in Atsugi, Japan, and Sembach, Germany, provide forecast services in their respective theaters. NAFD Sembach is functionally joint and collocated with the United States Air Force 21st Operational Weather Squadron.

In spring 2008, a new NAFD will be established in San Diego, Calif., and will be fully operational in late summer 2008. NAFD San Diego will be responsible for supporting the air stations in the western half of the United States: Whidbey Island, Fallon, Lemoore, North Island, El Centro, Pt. Mugu, Kingsville, Corpus Christi, and Fort Worth. They also will be the primary detachment for NAFC contingency operations.

Ltjg. Ceschini is operations officer at the Naval Aviation Forecast Center, Norfolk. Mr. Lammons is with the public affairs office, Navy Meteorology and Oceanography Command, Stennis Space Center, Miss.

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https://fwb.metoc.navy.mil
1-800-PILOTWX / 1-800-745-6899
Fax: (757) 445-9500 DSN 565 or
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Southeast Forecast Desk:
(757) 444-2594 / 2913 DSN 564

South Forecast Desk:
(757) 445-4040 / 2928 DSN 565

West Forecast Desk:
(757) 444-2576 / 2581 DSN 564

WARNING/ADVISORY	CRITERIA
Severe/Thunderstorm Condition 1	Imminent or within 1 hour (w/in 10nm) * Deviations from 10 nm for operational reasons only
Severe/Thunderstorm Condition 2	Expect within 25 NM within 6 hours
Local Airfield Wind Advisory (Small Craft)	18 – 33 knots sustained or freq gust to 25 Kts Includes seas for Airfield located near water.
Gale Wind Warning	34 - 49 knots sustained
Storm Wind Warning	50 knots or greater sustained
Winter Snow Advisory	Expect <1" of snow in 12 hrs, <2" in 24 hrs.
Winter Storm Warning	Blizzard, Moderate-Heavy snow, freezing precip imminent within 6 hours or occurring > 2" (Amount defined in Warning)
Freezing Precipitation Advisory	Freezing Precipitation Events < 1/4"
Freezing Precipitation Warning	Freezing Precipitation Events > 1/4" accumulation

WEATHER

Lightning Strikes the Rhino

Photo-Composite image.

By Lt. Bill Schenck and LCdr. Mike Chenoweth

We've all heard there's no such thing as a routine mission. Well, we were on one, or so we thought, but nothing was routine about this Friday the 13th flight or the way it would end with a Class-B-mishap visit from Mother Nature.

Our poor outcome resulted from bad judgment and decision-making. We just had wrapped up a successful fleet-replacement squadron (FRS) air-to-air detachment at Fort Worth JRB and were headed back to NAS Lemoore to enjoy a relaxing weekend at home. We woke up to blue skies, checked out of the BOQ, and headed to the exchange for souvenir shopping and chow. We then drove to the hangar for our brief. The flight plans already were filed, and our DD175-1 (weather brief) was faxed to us two hours before our takeoff time. We had a flight of three FA-18Fs, manned by six instructors; it was a simple, two-leg ferry from Fort Worth to Lemoore, with a stopover at Davis-Monthan.

The brief covered the standard items: admin, route of flight, emergencies, NOTAMS, and weather. The weather forecast for our first leg was severe clear. We glanced at dash 1, but we failed to notice the small print in the remarks section regarding possible convective activity in Southern California. The remarks also contained a recommendation to check the weather at Davis-Monthan. This important bit of information would come into play later in the day. But, we missed it and assumed the flight lead "had it covered."

with only a thin layer to climb over about 100 to 150 miles west of Davis-Monthan. As we approached California, we contacted Yuma MCAS PMSV to update our destination weather. Our position and ETA at Lemoore was passed, and a couple minutes later we received our forecast. Lemoore's weather was predicted to be overcast at 2,000 feet, with another layer at 10,000 to 11,000 feet. No mention was made of convective activity along our route, and we did not specifically ask about this activity. Our complacency probably stemmed from a lack of attention on the original DD175-1. As we approached Palmdale, we saw some buildups over the Sierras, but it looked like our route of flight was OK. As we turned northwest toward Lemoore, we saw our current flight path was VMC, with a thin layer below us, through which we could

Following the sound of a gunshot, we looked up to see three sizable bull's-eyes in the forward panel of the canopy.

We walked, happy to be headed home, read the ADBs, put on our flight gear, preflighted the jets, and manned-up. The leg to Davis-Monthan was uneventful. The weather was beautiful, and the flight went as briefed. We parked in the transient line, checked the airplanes, and made sure the fuel trucks were on their way. Our next priority was to find lunch. We got a ride to the golf course and enjoyed the weather as we ate. When we returned to base ops, the lead WSO (weapon-systems officer) glanced at the radar picture as we headed to the airplanes. The rest of us manned-up, and we again assumed the lead aircrew had things covered. The six of us should have crowded around the forecaster and gotten an accurate weather picture, particularly in Southern California, and adhered to 3710.

We started our aircraft, taxied, and took the runway as a flight of three. On engine run-up, we had a ladder caution, so the pilot pulled back the throttles. We stayed put as lead and Dash 3 departed. We taxied to the transient line to get the ladder restowed. Our flight plan was coordinated with clearance delivery and tower. This was our second chance to update the en route and destination weather, and we again failed to take advantage of it. After a 20-minute delay, we got airborne and were headed home.

The second leg started much the same as the first, see the ground. Buildups were to our north, but we could not tell how far north they extended toward Lemoore and beyond. We were fat on gas and, after a brief discussion, decided to request a descent through the thin layer, rather than wait and find ourselves descending through something worse.

Unfortunately, the controller vectored us on a northerly heading for our descent. They wanted to deconflict us from the airliner to our west and 1,000 feet below us, decending into Fresno. This vector put the line of thunderstorms closer on our nose than the northwest heading we were on, but still at a manageable distance to remain VMC—so we thought. This was another opportunity to break a link in the mishap chain: We simply could have asked to maintain visual separation from the airliner and sequence in behind him. We got an initial descent, still in Class A, and still VMC, but with an intermitted level off at 24,000 feet.

The controller clearly was very busy with requests on VHF when he said, "I need everyone to be quiet, and we'll all get through this." We were stepping on each other and blocking out numerous transmissions.

We requested and received further descent clearance but too late to get below the weather and remain VMC. Our radar showed we were getting closer to the cells but still were about 10 to 15 miles from the heavy returns. The clouds didn't look too ominous. The line was along our flight path and extended west and north to the edges of the scope. It looked like we would be keeping the cells far enough off our nose on our present heading. We entered IMC conditions and had a few seconds of rain and light turbulence. We kept our speed around 400 knots to avoid icing. A drawback to the increased airspeed was additional static-charge build-up on the aircraft, which increases the chance of a lightning strike.

That's exactly what happened.

Following the sound of a gunshot, we looked up to see three sizable bull's-eyes in the forward panel of the canopy. We also saw a hole in the CATM-9 seeker-head dome. Our immediate concern was the canopy, but it appeared the damage was limited to the flow coat. We had entered IMC at 17,000 feet. The strike happened at 14,500 feet, and we were back into VMC, in clear weather, at 11,000 feet. We could see the field from about 15 miles out. We decreased our airspeed and did a straight-in approach.

Why didn't we check the weather as thoroughly as we do for every flight when we lead, or when we fly with a student? I can't think of a reason not to, and there are many reasons why we should have, the least of which is that it's required. All pilots are responsible for a complete and thorough knowledge of weather conditions for every flight. The NATOPS General Flight and Operation Instructions Manual (OPNAVINST 3710) sets down the specific criteria. The pilot-in-command is responsible to see that the flight meets these criteria. You are required to get a completed DD-175-1 for all IFR flights. "For cross-country flights, you should attend the weather brief in person before filing your flight plan. The forecaster shall complete the form for briefings conducted in person."

Those last two sentences were taken from an instrument-training book I'd received in flight school more than eight years ago. We all know too well there is an increased number of unmanned METOC facilities throughout the continental United States. The days of going over and talking to your friendly weatherman to get the whole weather picture are all but gone. But, the aircrew still is responsible to be familiar with all the available charts and data, so that you can have a complete picture of the expected weather along your route of flight. The ADDS (aviation-digital-data service) website provides comprehensive, user-friendly, aviation-weather graphics to help you do just that.

Remember, no flight is ever routine. Take care with your preflight planning. Be prepared to become the mission commander or flight lead at any time, without notice—you must act effectively in those roles. Always have a divert field in mind, and watch out for get-home-itis.

Lt. Schenck and LCdr. Chenoweth are instructors in VFA-122.

Avoiding Thunderstorms

More than 44,000 thunderstorms occur daily over the earth, and pilots occasionally can expect to encounter one. Knowing thunderstorm characteristics and applying tested procedures will help aircrews operate more safely in the vicinity of those thunderstorms.

Most lightning strikes occur when aircraft are operating in one or more of the following conditions:

- within 8 degrees Celsius of the freezing level,
- within about 5,000 feet of the freezing level,
- in precipitation, including snow,
- in clouds, and/or
- in turbulence.

All these conditions do not have to occur for a lightning strike or an electrostatic discharge to take place.

Thunderstorms have many potential hazards. Here is a list of recommended practices to avoid the same fate as we did:

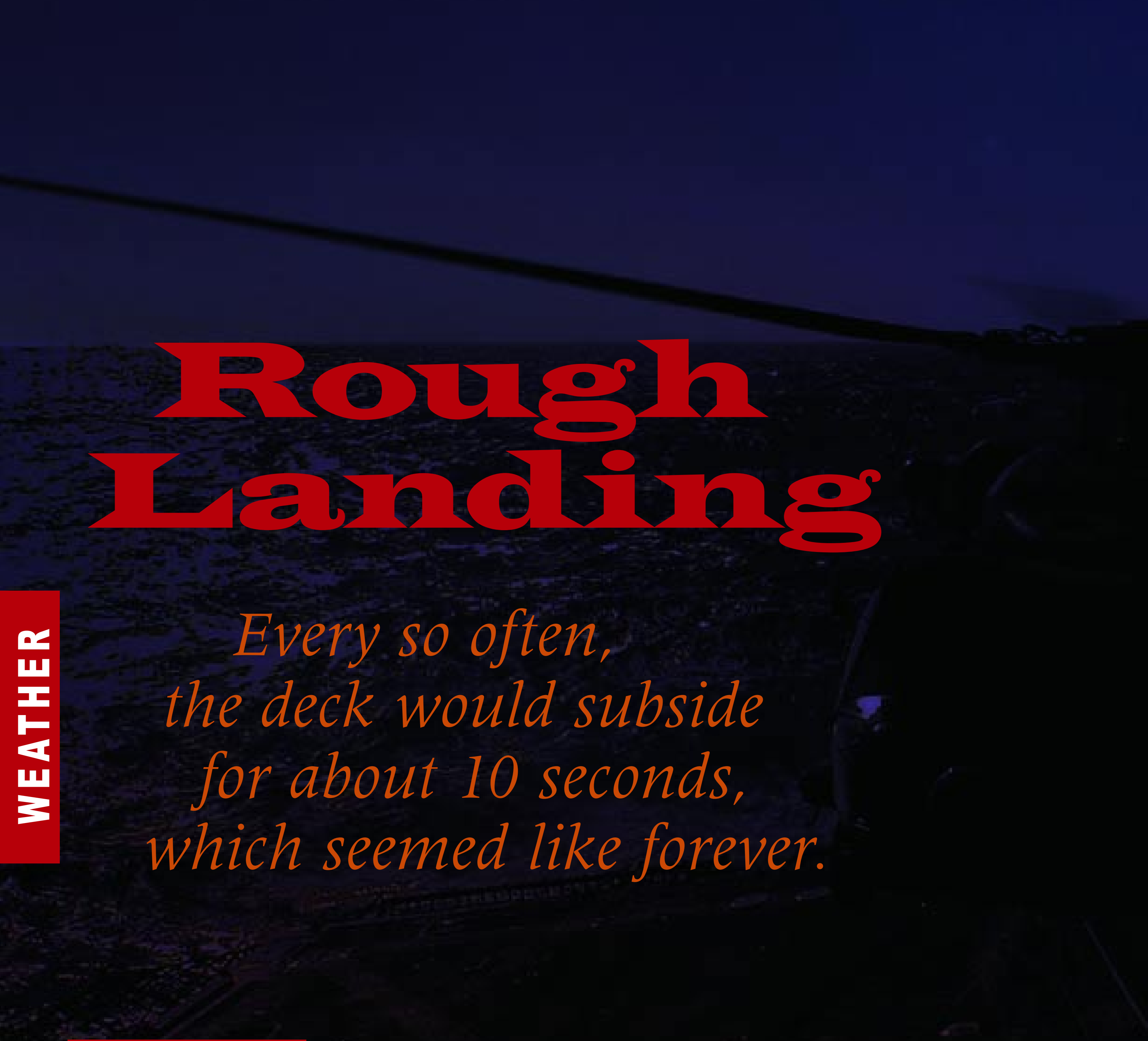
- If at all possible, avoid thunderstorms.
- Do not venture closer than 20 miles to any mature, visible storm cloud with overhanging anvils, because of the possibility of hail.
- Do not fly under thunderstorms, even if the area on the other side of the mountains can be seen. Winds that are strong enough to provide the lifting action to produce the thunderstorms also can create extreme turbulence between mountain peaks.

Thunderstorms should be avoided if at all possible:

- Fly around the storm.
- Fly over the top of the storm.

If you can't avoid the storm then fly through its lower one-third.

When thunderstorms are isolated, they easily are circumnavigated, provided the surrounding area is clear of masking clouds.



Rough Landing

Every so often, the deck would subside for about 10 seconds, which seemed like forever.

By LCdr. Jerrod E. Devine

I was a new LAMPS detachment OinC and recently had read an article written by an HSL-46 det OinC about his experience during Neptune Warrior (NW). The author's crew had had to make a tough choice shortly after launching when the weather conditions rapidly deteriorated. They had had to decide to divert to the beach or return to the ship, not knowing if they could land.

Photo by MCS3 Ron Reeves. Modified.

I used his article and its scenario in our NW 06-3 briefs before shipboard operations with USS *Samuel B. Roberts* (FFG-58). We gathered some absolutely great lessons from their experience. Nothing like that was going to happen to us, though. Boy, was I wrong! Here's my story.

We had some rough weather (heavy seas and wind) the first week out of Faslane, Scotland, and tried to follow our exercise brief. However, because of the weather, some events were cancelled—the ORM process was working.

The night started out well enough. The seas were fairly calm, and we looked good to fly three events in support of the NW exercise. The first launch took off uneventfully, with the exception of degraded communications. The ship had taken down land/launch (L/L) to support another frequency, and when they patched L/L back in, the communications from the helo to the LSO shack barely were readable. This comm problem was the first opportunity to stop the mishap links from building.

The first crew came back on time, landed, and my crew jumped in ready to continue surface and possibly subsurface warfare ops. The comms still were weak but manageable (under low-stress conditions). Why didn't we stop there or wait on deck until the comm issues were resolved? We were given another chance to break the link but didn't.

About halfway through the event, the ASTAC (ship's air controller) made a comment about taking a real good pitch or roll. I questioned him on what he had said, as the seas at our location looked fine (from 700 feet AGL). We were about 35 miles north of the ship, conducting an area search, while the ship moved toward us. We had no further discussion regarding the apparent building of the seas—another link was added.

We finished our event, and the ship called flight quarters on time; we had 1,200 pounds of fuel left, which was plenty of gas. As we descended to 200 feet and started our practice approaches to the flight deck, we could see the ship pitching and rolling heavily. I mentioned to the crew that our landing would be interesting.

The ship searched for about 20 minutes to find a heading that minimized their pitch and roll. With winds in the envelope, though, they could not find one. The LSO told us we were out of limits and would be taking a recovery-assisted (RA) landing.

We got a green deck with about 900 pounds of fuel left. I let my copilot, one of the detachment's H2Ps, shoot the approach, while I closely guarded the controls. As the nose of the helo came across the deck edge, the ship took a very severe pitch up, and our stress level pegged at high.

The horizon-reference-set bar became our best friend in the world. My copilot had an extremely difficult time maintaining position because of the excessive ship motion (pitch 3 to 4 degrees, rolls 8 to 10 degrees and occasionally greater). I took the controls, hoping to have a better time maintaining position.

Then the communications issue crept back in. With the LSO and me at a high stress level, it became difficult to effectively communicate with the one person I needed most: the LSO. I had to talk on L/L and have the ASTAC relay it internally to the LSO. Two hook-up attempts were made without success, and we were told the messenger cable actually had severed—there went our chance at an RA landing.

We now were down to about 650 pounds of fuel. An airport in Stornoway, Scotland, was about 10 miles to our west. Why hadn't we plotted its position earlier in the flight? Was this another link for us?

We had a decision to make: Do we land on a deck clearly outside of landing limits, or do we make a run to the beach? I had the LSO clear the deck very quickly and let him know I would try a free-deck landing. I figured if it just wasn't possible, I could divert to the beach and land. This plan would have meant landing below minimum fuel state.

With the ship severely pitching and rolling, the LSO gave me cueing on when he thought the deck would be level. Every so often, the deck would subside for about 10 seconds, which seemed like forever. I maintained the higher hover until the LSO called me clear for landing; we could hear him fine, but he couldn't hear us. I landed and shut down the aircraft. My nerves were shot.

I maintained the higher hover until the LSO called me clear for landing; we could hear him fine, but he couldn't hear us.

We definitely learned some lessons that night. I should have taken the ASTAC's comments with greater caution, especially in the unpredictable waters off Scotland, and asked him to monitor the ship's attitude for at least the next 10 minutes. We could have asked the ship to turn around to reach better waters, so we could have landed early and called it a night. We've since discussed this evolution with our air controllers and bridge-watch teams.

The seas were deceiving to us from the air. I usually associate the ship's big pitch and roll, lots of wave action and white caps, with increased winds. We did not see those conditions that night. The winds were not incredibly strong, and the seas just were rolling in. After later talking with the OOD, I'm not sure they could have found better conditions for us. Take away the pitch, and the rolls would have been even worse. Take away the rolls, and the pitch would have been much worse.

Seeing the effects of degraded communications on what was an absolutely miserable night has changed my comfort level when conducting any operations without perfect comms. Maybe I should have reached that decision earlier—I wish I had. I since have gotten concurrence from the captain that, to avoid future communications issues, as long as the air department is embarked, we do not take down L/L.

Sending articles to *Approach* and having aviators read and learn from them is a proactive step in aviation safety. I had read the earlier article and thought I had learned the lessons, but I was wrong. There are hundreds of hazards out there; each one is waiting patiently to reach up and cause a bad night. I hope this story helps the next crew make better decisions.

LCdr. Devine flies with HSL-48.

Forecasting Desert Dust

Southwest Asia is one of the most difficult areas in the world for weather forecasting, largely because of air masses from five regions surrounding the area

This satellite photo shows how extensive dust storms can be.

By Capt. James H. Glass, USMC

Dust storms in Southwest Asia, which includes the Middle East and Afghanistan, often cause problems for air operations and degrade laser-guided weaponry.

The dust typically consists of fine particles easily picked up and held aloft by the wind. In Iraq, the dust originates in areas such as the Tigris-Euphrates River valley, Syria and Jordan. Sources in Afghanistan include an area once known as the Hamoun wetlands, where a combination of expanded irrigation and severe drought caused the region to dry up.

Besides frequent dust storms, the region has high levels of air pollution, which also contribute to visibility problems.

Southwest Asia is one of the most difficult areas in the world for weather forecasting, largely because of air masses from five regions that surround it: Central-North Africa, Europe, Arabian Peninsula, Central Asia, and the Indian subcontinent. The complexity of the weather patterns further is compounded by extremely hot deserts, mountain ranges, and very warm waters. Also, the region has a lack of meteorological sensing systems to collect the data to populate the computer models.

Two types of dust events are common in the region:

A "shamal," a term from the Arabic word for "north," normally blows persistently during the summer months over Iraq and the Arabian Gulf. The shamal sets up when a strong cold front, cooler than the surrounding air mass, passes over the mountains of Turkey and

Lt. Marne Balolong aboard USS *Gunston Hall* (LSD-44) experiences dust storm at sea during Operation Iraqi Freedom.

Kurdistan. This system kicks up sand and dust that can remain aloft for several days.

The second type of dust event is known as a "haboob," from the Arabic word for "phenomena." The haboob results from the collapse of thunderstorms. When this happens, precipitation is released, and the winds begin gusting outward from the thunderstorm. These gusts are generally strongest in the direction the storm is moving. When the downburst of air reaches the ground, it blows the fine dust and sand into the air, creating a wall of sand, which has been known to reach 60 miles in width and several thousand feet in height.

Forecasters have two major tools to predict and track these events. The first is a dust model, which incorporates a dust-region database derived from topography and known dust-source regions. The information is used to formulate a 72-hour forecast.

The second tool is an enhancement of satellite imagery, using a combination of infrared and visual elements to interpret fine-scale features of dust.

These products and more can be found on the Naval Central Meteorology and Oceanography Center (NCMOC), Bahrain website at: SIPRNET:http:// www.ncmoc.navy.smil.mil, or by calling DSN 318-439-4083, comm. 973-72-4083, and on the Marine Corps Tactical METOC Fusion Cell website at: SIPRNET: http:// metoc.mnf-wiraq.usmc.smil.mil.

Capt. Glass is a meteorology and oceanography officer with Headquarters and Headquarters Squadron, MCAS Miramar, Calif.

Photo-Composite image.

Shoot the Approach

By Lt. Gene Trelles

The weather forecast had been good for both my events. Flying conditions started out great and promised to remain so through the second flight. I debriefed my first student, got a drink of Gatorade, and went to the ODO desk to recheck the brief time for my second event, an early instrument flight. We were assigned the same aircraft I had just flown. I also had been asked to complete a back-in-the-saddle flight for another instructor, which I agreed to do. I didn't think the one approach and three landings needed for the other instructor would affect my later event.

The second student event only required three approaches and holding, and a point-to-point. I briefed my student, told him about the hotseat, covered the NATOPS brief, and looked at weather. Fog was forecast to roll in but not for two hours after my land time. My plan was to complete the back-in-the-saddle flight, then hotseat the student for his flight. We would start with a point-to-point, enter holding, and then do the PARs (precision approach radar) at Kingsville, and end with a full stop at NAS Corpus Christi. The PARs were down at NAS Corpus Christi.

The back-in-the-saddle flight was uneventful, and I landed with more than 350 pounds of gas per side for the instrument flight. We took off with a little more than 325 pounds a side. The point-to-point and holding went well, with few or no errors from the student. The original plan still was feasible for flying to Kingsville, about 40 miles to the southwest. As it began to get dark, the student did the first PAR to a missed approach for training. We began to turn on the base leg on our second PAR when tower said they could not accept a second approach. A small change in the plan was not a problem. We would adapt by adding another approach at NAS Corpus Christi. It was dark, but the weather still was good: no mist or fog in the area.

We flew back to NAS Corpus Christi and were on the final approach course when I saw the mist forming; however, visibility was good, and I let the student fly to the missed-approach point. I then took controls for a touch-and-go. One more approach to a full stop and the flight would be complete. The last approach was a VOR-procedure-turn approach with the MDA (minimum-descent altitude) at 760 feet. While on the approach, I saw the mist thicken, but because we planned for a full stop, I figured we would finish the flight before the mist got worse. We were final-approach course inbound when we were told by tower, "The field is below minimums for the VOR approach; would you like the localizer?" I took the radio from the student and replied that the localizer to the same runway was fine.

I began to change the approach plate when we were instructed to execute a missed approach. I took the controls and radios from the student and asked for clarification. I assumed I was going to sidestep to the localizer, which would have been a small right turn and a descent to get on profile. I was told to wave off and execute missed-approach instructions. I waved off and was given radar vectors to final-approach course for the localizer. As I waved off, I could see the field, but the mist quickly was turning into fog. At the end of my downwind leg, my left fuel-low light began to flicker with about 100 pounds of fuel, and the right side only had slightly more. I turned final, got to my MDA of 300 feet, and was surfing the plane over the fog.

At this point, all the mist had become fog. I could not see any of the lights below me, including the runway-approach lights or the runway lighting. When I reached the missed-approach point, I executed the missed approach. I then made my missed-approach call to tower and gave a quick PIREP (pilot "weather" report) that the fog tops were at 300 feet. I was unable to make out the field and declared min fuel. My left fuel-low light still blinked.

I asked for the weather at Corpus Christi International Airport, which is our local weather divert, about 15 to 20 miles away. They had a broken fog layer at 1,000 feet, so I got permission to divert. I knew declaring minimum fuel would not get us priority handling. I stared at my fuel gauges and tried to do mental math while listening to the radios. I figured I was third in line for the approach. I still was getting vectors away from the field when the right fuel-low light started to blink. I declared an emergency for low fuel, got vectors toward the field, and saw the runway. The broken layer at 1,000 feet was about 10 miles from the field, so I landed, using a straight-in VFR approach.

In the T-34, we are supposed to land with no less than 90 pounds of fuel a side. When I shut down, I was at 70 pounds on the left side and 80 pounds on the right. On the first approach into NAS Corpus Christi, when I saw the mist building earlier than forecast, I should have done a full stop, instead of a touch-and-go. I should have incompleted the flight for weather. In the training command, nothing meets the operational-necessity criteria. On the second approach, I should have continued with the approach, instead of trying to switch to the localizer. FAA dictates once an approach is commenced, you can finish it, even if weather drops below minimums for that approach. The problem was I thought I was offered a sidestep, when I actually was being offered to discontinue the approach and start another approach with a lower MDA. Next time, I will communicate more clearly and solicit better feedback.

Our mission plan was good until things rapidly started to change. Incompleting the second PAR hurt, because we were more than halfway through the approach before we had to break it off. This action burned off about 25 pounds of gas, which I could have used on subsequent approaches. Once I saw the mist thicken on the first approach into NAS Corpus Christi, I should have picked an approach with a lower MDA that the student could have completed (such as the TACAN or VOR/DME 13) with an MDA of 340 feet. I know plans change, and this incident shows that you have to be flexible.

Lt. Trelles flies with VT-28.

WEATHER

Snap, Crackle, Pop

By Lt. Paul Brantuas

As I headed to work one sunny Lemoore morning, I noticed the winds were howling: sustained greater than 25 knots, gusting greater than 30 knots. These conditions made it out of limits for me to launch.

Not in any hurry, I worked most of the day trying to get ahead with my desk job. My orginal destination, Albuquerque, New Mexico, for a gas-and-go, didn't look good for winds or weather, so I refiled to Davis Monthan AFB in Arizona. I planned to spend the night, then launch in the morning to reach my ultimate destination, NAS Corpus Christi, Texas.

I was having difficulty with the new version of Navy Flight Weather Briefer, so I printed my DD-175 and faxed it to a weather briefer at NAS North Island. I had used North Island's weather briefer just two days earlier when I returned to NAS Lemoore and was impressed with their expeditious service. The winds finally had subsided, so I called NAS North Island to get an update to my DD-175-1. They faxed back a new dash-1 with the updated void time, along with the weather briefer's initials, and I was on my way. I launched just before sunset, with a daytime visor, and proceeded to Davis Monthan. Before I left, I visited the aviation-digital-data-service (ADDS) website to verify the en route and destination weather. Having been on numerous cross-country flights, using ADDS as a backup is a standard practice. Until my en route descent, the flight was uneventful.

The en route descent was from FL270, 50 miles northwest of Davis Monthan, in an FA-18C, at night, in what was supposed to be good weather—except for an unforecasted thunderstorm brewing 30 miles southwest of the field. So far, it had been a beautiful night, with stars filling the desert sky.

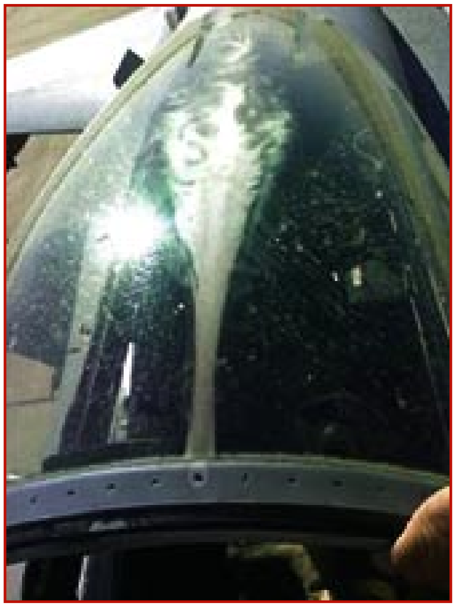
Passing FL220, I briefly encountered IMC conditions. As I asked air-traffic control if there was any significant weather between me and my destination, I watched static electricity build from wingtip to wingtip and encompass my jet. According to my controller, I was clear of any significant weather. Davis Monthan ATIS reported the field VMC. I brought up my air-to-ground radar, leveled the elevation, and saw nothing. Static electricity was crackling off of my canopy bow, so I reached up and lowered my daytime visor. I asked for an immediate descent and a vector to the east to get away from whatever I was in now. Then I heard "snap, crackle, pop." Something terrible just had happened.

Initially after the strike, I thought I had experienced a total electrical failure. The light had blinded me, and it felt like somebody had smashed my canopy bow with a baseball bat as hard as he could. The jet shook violently. After about five seconds, which at the time seemed like an eternity, my instruments and displays slowly came back into my vision. I saw haze above my left eye, so I knew something was not quite right with the canopy or my left eyeball.

When I got on deck at Davis Monthan, I called the duty officer and the operations officer (Ops O) to let them know I just had experienced what I thought, at the time, was a massive static-electrical discharge. I told the Ops O that I would look at the jet in the morning to get a better idea of any damage. When I saw the plane the next morning, it was clear the canopy was damaged badly. Also, the trailing edge of the starboard rear stabilator had a hole the size of a fingernail surrounded with burn marks. The "exit wound" confirmed a lightning strike, instead of a static discharge. I was happy to be alive. I just wanted to return to NAS Lemoore and end my journey.

While at Davis Monthan, I had their weather ser-

The light had blinded me, and it felt like somebody had smashed my canopy bow with a baseball bat as hard as he could.

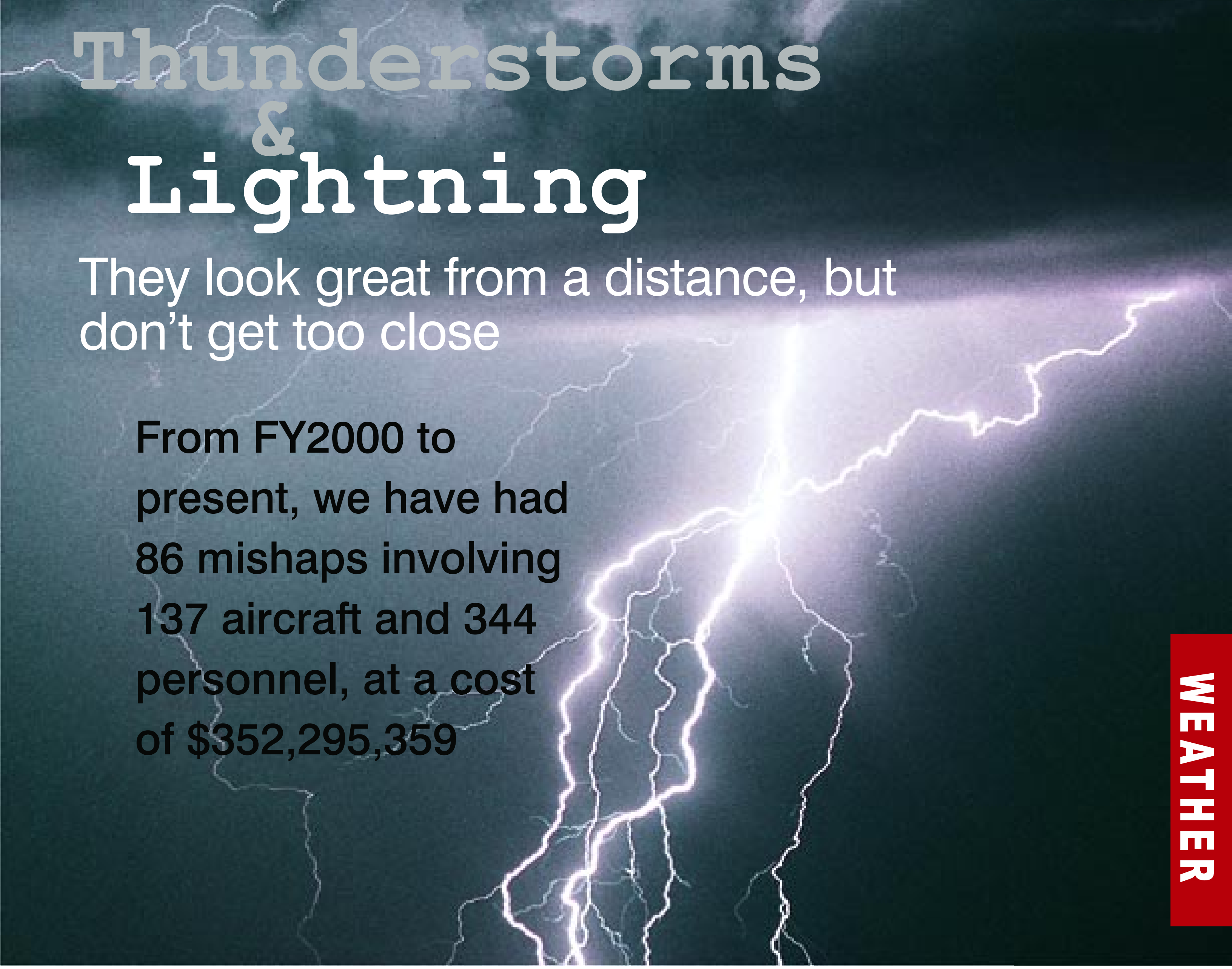


Lt. Brantuas' damaged canopy

vice recall the weather data during my flight. I came to the safety officer armed with a stack of printouts, including graphical depictions of lightning strikes that night, ready to tell my story. All things being said, I had done everything right and had covered my bases. I didn't fly through any known thunderstorm conditions but had encountered an unforcasted one in the vicinity. The damage to the canopy was in the Class-C category, and the stabilator was an easy fix.

I've heard of lightning strikes in clear air occurring nowhere near thunderstorms. Having been through this experience, if you ever see one remotely close to your route of flight or destination—divert; it's not worth the risk. From what I've learned, you don't have to be near a thunderstorm for lightning to reach out and slap you. I have seen a lot in my nine years of naval aviation, but this flight tops the list. You can dodge a surface-to-air missile (if you see it), jink around 57 mm, but you won't stand a chance against mother nature when she is angry. Just stay away from her and live to fly another day, or night.

Lt. Brantuas flies with VFA-125.



Thunderstorms & Lightning

They look great from a distance, but don’t get too close

From FY2000 to present, we have had 86 mishaps involving 137 aircraft and 344 personnel, at a cost of $352,295,359

B A S H

Flight plan filed—check.
Weather brief—check.
BASH condition—?

Have you checked the current bird-aircraft-strike-hazard (BASH) condition for your airfield and route of flight? Real-time BASH information, determined from weather radars throughout the United States, is available online at:
http://www.usahas.com/
http://www.usahas.com/bam/

In FY2007 there were 635 bird strikes with a cost of $1,821,805.

Accurate reporting of BASH incidents using WESS is necessary for analysis and mishap prevention.

WEATHER

Icing in Southern California

By Capt. Dan Fitzpatrick, USMC and 1stLt. Tim Scherling, USMC

"Mayday, mayday, mayday. Wolfpack 55"

"Wolfpack 55. Maintain niner thousand. Wolfpack 55. Is there something wrong? Talk to me."

"Wolfpack 55 going down."

"Cessna 59er delta. Traffic right above you is an H-53, 6,000 feet, descending. I don't know what he's doing; he's supposed to go east bound at, eh, 9,000. Can you see him right in front of you, 5,400, descending?"

"Affirmative."

"Cessna 59 delta. Watch him closely. I don't know what he's doing; maintain visual separation."

We had fallen 7,000 feet in three minutes. We were in the goo, and on goggles, eight miles east of home. It was my copilot's first night flight in the fleet.

It was late January, and we were on a routine training mission in the Yuma area. The plan was to depart from Miramar as a section, separate for single-ship CALs (confined-area landings), rejoin later for section CALs, and then RTB.

Inclement weather was forecast to move into the area at our takeoff time, so we discussed getting separate instrument departures and joining up in the training area. We were briefed by our ODO that the freezing level was at 8,000 feet.

During startup, we checked ATIS at Miramar and heard AirMet Zulu was valid. Our section lead asked the ODO to look it up, and he said the AirMet indicated the freezing layer went from 8,000 to 22,000 feet. Our interpretation of that statement was our first error. We concluded the freezing level no longer was at 8,000 feet but, rather, had gone up to 22,000 feet. We agreed that was unusual but possible with the passage of a front or an inversion layer.

The weather started to move in. As our section

WEATHER

lead took off, we stayed back to troubleshoot our aircraft. Lead called us after 15 minutes and reported the weather was good over the mountains to the east, and we could depart VFR. An additional 45 minutes went by before we got out of the chocks. Finally, we departed VFR, and as we climbed through 5,000 feet, the weather started to close in around us. We had definite visible moisture, and we checked the OAT; it indicated 11 degrees Celsius. We decided to head back to Miramar and file an IFR flight plan to get us over the mountains and into our training area.

We contacted MCAS Miramar tower, passed our intentions, and they filed our flight plan for us. We remained on deck between the parallel runways at Miramar while waiting for our clearance. We didn't try to contact Miramar metro or get a weather brief from a qualified observer. If we had done so, our misinterpretation of the AirMet would have been clear, and we would not have accepted our subsequent clearance to 9,000 feet.

We received our clearance, took off from Miramar, and turned north in accordance with our climb-out instructions. We immediately were cleared to 9,000 feet and continued our climb. We were in the clouds by 3,000 feet and noted our OAT was 12 degrees. We checked our temperature three times during the climb and level off, and it never dropped below 10 degrees.

We were vectored northeast and then east-southeast to intercept our radial off Mission Bay VORTAC. We were level at 9,000 feet, heading 110 degrees at 100 knots, and in the clouds. At level off, we engaged our barometric-altimeter hold and again checked our OAT. I felt a little suspicious about its accuracy; it hadn't moved much since we climbed through 5,000 feet. I

I took the controls and felt what I only can describe as a violent departure from controlled flight.

could not see the gauge from the right seat, and my copilot was on the controls. So I asked our crew chief to come up and tap on the gauge to see if it would respond. As he climbed on the crew seat, my copilot said he thought we were in a rate of descent.

I came on the gauges and initially did not see any rate of descent. I did, however, get the seat-of-the-pants feeling we were gaining airspeed and falling. My copilot put in a bit of aft cyclic to see how the aircraft would respond. I initially saw our VSI fall to 500-fpm descent and then through 2,000 fpm. Our attitude indicator was nose up and rolling left and right. I thought my copilot might have had vertigo and was putting the aircraft into this unusual attitude.

I took the controls and felt what I only can describe as a violent departure from controlled flight. The aircraft pitched up and down and rolled left and right with no response from my cyclic inputs. Over the course of the fall, I remember seeing almost every possible attitude. We remember seeing the bottom of our attitude gyros, which indicated we were 60 degrees nose down and 30 to 40 degrees left wing down.

We rapidly descended through 7,000 feet, and I remember hearing SoCal approach control trying to contact us. I told my copilot to make our mayday call.

During our fall, we tried to troubleshoot our problem. I quickly analyzed which flight-control inputs had an effect and which did not. The cyclic had no effect on our attitude, but the collective was a different story. With the collective up, we would droop turns, but torque remained low. One thought from flight school went through my head: "Turns are life."

With that thought, I announced to the crew I was entering the autorotation. We could preserve Nr, which was all we had control of, and it gave us hope: At least we could pull at the bottom.

We had two things while we were up there: time and altitude. We had a lot of time and plenty of altitude to work with. We could not figure out what the problem was, so we rechecked our engines—they were all on and seemed to be working. My copilot thought it might be an automatic-flight-control-system (AFCS) problem, so he secured our AFCS servos. That move didn't fix anything, so he quickly turned them back on.

At around 3,000 feet, I realized we had recovered from the unusual attitudes and were wings-level. I tried to nose down the aircraft to get 100 knots for the autorotation. Finally, the aircraft responded. We soon broke out of the clouds at 2,000 feet and saw mountains on three sides of us. We had spiraled down through a bowl of mountains. I asked my copilot to look for a place to land, and he pointed out an airfield at our 1 o'clock. After regaining control of the aircraft, I did another quick analysis of my inputs. We had torque indications as I pulled up on collective, and Nr was around 107 percent. My copilot had pushed our speed-control levers to full forward. We were at 100 knots, and our rate of descent was 500 fpm.

We did a running landing to runway 27R at Gillespie Field. We didn't talk to anyone on the way in, but tower had received a call from SoCal about us heading there. Tower was happy to hear from us when we finally called them from the FBO where we parked. We checked our OAT after landing; it indicated 11 degrees.

We had flown in known and published moderate icing conditions for more than 10 minutes. Our experience is a perfect example of normalization of deviance. In the past, if we were unable to depart VFR, it was a common practice for us to file a flight plan from the aircraft without talking to a qualified forecaster first. According to OPNAV 3710, that is wrong. You need to talk to forecaster, if one is available, before filing any instrument-flight plan.

A combination of mistakes, a faulty gauge, and normalized deviance led to a circumstance that could have killed us.

Capt. Dan Fitzpatrick and 1stLt. Tim Scherling served with HMH-466 at Al Asad, Iraq, in support of Operation Iraqi Freedom.

Photo by PH3 Kevin S. O'Brien. Modified.

Mountain Shadow

By Lt. Lamar Hardy

It was a standard Navy day, at least to me it was. You know, rolling out of your mosquito-net-guarded cot in a hangar of 500 Soldiers and Sailors in a city where the nearest ocean was an eight-hour flight away.

The HSC-26 Det 1 "Desert Hawks" were deployed in support of the Pakistan earthquake relief. We had been living the high quality of life our Army advertises. Our living facility was a single hangar that had been transformed into barracks. The hangar had no running water, so we took three wooden pallets and tied down 100-gallon coolers on top to make showers. We ate chicken and rice three times a day. The flight tempo had been high, and with our two aircraft detachment, we were rotating three crews for nearly seven hours of flight time, per aircraft, each day. After supporting the relief effort for two weeks, my crew was used to our new way of life.

The days began with a 0500 formation and intelligence brief. These formations generally were made of mixed aircraft, and for my flight today, we were flying a three aircraft formation of one Army CH-47, one Navy MH-53, and my MH-60S Dash 3. Our first of many missions of the day was to depart the airfield at Qasim, fly 10 miles north of Chaklala to pick up the cargo load, and then get further tasking. After we arrived at Chaklala and received our tasking, the formation departed for our second predetermined LZ flight to the north to drop food and other essential items.

The CH-47 and MH-53 are much larger aircraft than the MH-60S, so the landing zones are more limited. Because our aircraft and cargo load were much lighter, we had to take the supplies to the houses not accessible by vehicles. During our briefing at Chaklala, we were told our drop zones were uncontrolled. We would have to fly low passes or come into a hover to unload our supplies, while our playmates landed at their controlled LZs to unload. Because our flight time was higher than the rest of the flight, I decided to get a full bag of gas: 3,700 pounds.

We launched from Chaklala and verified our calculations via power checks. We used our calculations and actual numbers to determine the max altitude we could perform our drops. The first two missions were uneventful, and we flew to the drop zone. After unloading our cargo, we landed at one of the other controlled LZs to pick up any other survivors who required priority medical attention. Upon returning to Chaklala, we would unload the survivors, shut down for gas, and reload cargo.

We received our ops brief, and were prepared to depart for the third and final mission of the day. This flight would take us farther north into the Himalayans than we had been previously. We determined our max LZ altitude to be around 7,000 feet. As expected, flights into the Himalayans are surrounded by mountains towering more than 15,000 feet. This leg had us crossing high-altitude ridge lines, including the last ridge line at 9,500 feet. From there, we'd split our flight, so our playmates could land and unload while we continued our flight and unloaded supplies. Weather was not a factor, with the temperature around 15 degrees Celsius, and only a scattered layer well above 10,000 feet.

Before entering any LZ, we would verify wind direction and perform a max-power check. To obtain the wind direction, we would use our embedded global-positioning system/inertial-navigation system (EGI), and use any available flags or trees to verify that information. For this leg of the flight, we were fortunate to have a Pakastani-made LZ (rocks laid on the ground in the shape of an H, with a wind sock).

Our EGIs had indicated winds out of the southwest, while the windsock indicated the winds were out of the east. Because the windsock rarely lies, we used this as our main indicator for true winds. From there, we would set up for an approach to the LZ into the wind and perform our second max-power check. Our margin of safety was a 5-percent buffer to allow for a waveoff. The LZ of choice was on the upwind (according to the EGI) side of the valley, at nearly 6,500 feet MSL.

After completing the max-power checks, we noted we were pulling 102-percent torque. Our calculated max torque was 104 percent, which left us only a 2-percent margin of safety. Because of this situation, we continued down to 5,000 feet MSL, where we found another LZ, this time on the downwind side of the valley. The wind appeared to be the same as the previous LZ, as we set up for our power checks. Power in a hover-out-of-ground-effect (HOGE) indicated 82 percent, which gave us more than a 20-percent margin of safety.

The LZ of choice this time was a football-sized piece of farmland, with terraces approximately three-to-four feet high. These terraces appeared to be nearly 25 to 50 feet wide, stretching and descending down the valley. The eastern, western and northern perimeter of the LZ was outlined with low-lying wires about 20 feet high. The southern side of the perimeter was our 9,500-foot ridge line that was nearly vertical. The north end of the LZ, in the center of the valley, was the river bed. With these factors considered, we briefed the approach and discussed that our waveoff route would be toward the center of the valley.

As we set up for our approach into the wind, we faced rising terrain off the nose and our ridge line to the right. I turned on contingency power (C-power) and commenced the approach. After obtaining a stable hover at 50 feet AGL, I said I would be coming down and right to our briefed zone. I then called for the doors to open and to begin dropping the supplies. The copilot, while monitoring the engine instruments, called for a waveoff. Not second-guessing the rhyme or reason to wave off from a perfectly stable hover, I began to execute the waveoff; I lowered the nose and pulled power.

This action, of course, was the wrong choice. As I increased the collective, I saw the ridge line was no longer out the right side but now was directly in front of me. My copilot said our NR was continuing to decrease and read 91. Realizing the situation I had put myself in, I started executing the loss-of-tail-rotor-effectiveness emergency procedures. My first step had me place about 5,000 pounds of pressure to the left pedal, while I reduced the collective slightly and followed the turn with cyclic. The most uncomfortable feeling I ever had felt came over me. I had the controls; my hands and feet were indeed on them. However, I absolutely had no control of the aircraft that was flying me. Our superb crew chief began to make all the clearance calls, as we began a slightly more aggravated spin. The 50-foot terraces actually were 10 to 15 feet wide, which, of course, added to my situation.

I continued to circle and tried to regain control of the aircraft. Then my copilot called, "Wires, wires, wires."

This call came over the formation frequency, instead of the ICS. After making half a dozen revolutions and keeping enough power on the aircraft to prevent complete touchdown, I had regained enough control to set down the aircraft on the terrace. Fortunately, the terrace was the exact footprint of our aircraft. Looking out the left side of the aircraft, I had a mere four-to-five foot clearance from the slope of the terrain, so I kept extra power on the rotor blades.

After a few seconds to regain composure, I asked the crew chief to give a quick walkaround. The crewman then completed the aircraft walkaround. He said we had scraped the belly of the aircraft, and our dump tube had broken off, but no other problems were noted. I looked up the hill and saw the locals, excited about receiving their supplies, coming to help unload the cargo.

I ordered the crewman to empty the aircraft of all supplies, hoping to lighten the load, so we could depart before we were overrun. The next sight I had of the four-to-five-foot terrace and rotor-blade separation was a local doing the "duck walk" under the rotor blade to gather supplies we had dropped. The crew chief managed to get him safely out of the rotor arc, and we accepted the downwind departure.

As I increased the collective, I saw the ridge line was no longer out the right side but now was directly in front of me.

After departing the LZ, we closely monitored our engine indications to be sure we had no other malfunctions. We noticed no other aircraft problems. Our playmates, hearing our wires radio call, were circling overhead. We reported the situation and stated our intentions to return to the closest controlled LZ for a better walkaround. We split up the formation and continued single ship to Muzahfarabad. After landing, we left the rotors turning, and the crewman exited the aircraft for the walkaround. I left the copilot on the controls and took a look at the aircraft. Our dump tube had been broken, the tail lock pin had been sheared, and the belly of the aircraft was covered in mud.

The flight into the controlled LZ was fine; all instruments indicated normal, so I opted to rejoin the flight and return to Chaklala. Because of the mountains, our first radio communications with base did not occur until we were about 10 miles out.

Again, the flight back was uneventful, and we chose to shut down for gas. During the shutdown, we heard a loud whistle seeming to come from above our heads. As we continued to shut down, I noticed a hole the size of my fist in the main rotor blade. At that moment, I experienced the second worse feeling I ever had felt. Noting the condition of the aircraft, we began arranging other means of transportation with our playmates back to Qasim.

Looking back, and having discussed the incident with Army helo pilots who are experienced flying at high altitude, I believe I entered a tail-rotor, vortex-ring state, which was aggravated by the standard Navy waveoff. I identified it as tail-rotor, vortex-ring state because of the unpredictable and uncommanded yaw rates, which I could not control by full pedal inputs. Full left pedal demanded max power to the tail rotor, therefore taking power needed for the main rotor and resulting in NR droop. The situation was only worsened by having a waveoff route that was to the left, over an LZ that did not permit landing. Subsequent flights in the area were completed with a max of 2,400 pounds of fuel to reduce gross weight, and we maintained forward airspeed during all drops in which we did not land.

Many lessons were learned from this experience. Power available and power requirements may not indicate the ability to enter an LZ. The Army high-altitude instructors explained the region I had entered was a "mountain shadow," where the valley winds are lost, and the downdrafts over the mountain are a factor. Through the Grace of God and solid CRM, we kept this near-mishap a hazrep.

Lt. Hardy flies with HSC-26.

Mishap-Free Milestones

VR-46	22 years 9 months	100,000 hours
VAQ-136	20 years	32,800 hours

The Bulletproof Canopy

By Lt. Nathan Barton

A wise hinge (aka lieutenant commander) once told me, "Every once in a while in naval aviation, something crazy happens that you totally didn't expect, and the excitement those situations bring is what makes this job what it is."

"Preach it, brother," I thought, as I slammed the throttles to idle with the speed brakes extended and watched pieces of shredded metal and nylon rain down on our jet. I felt like I was standing naked in a Kansas hailstorm, as I unsuccessfully flailed to avoid the countless shards of metal that were zipping down our intakes and piercing our jet.

It was the first week of COMPTUEX, and like most other Prowler nuggets, I started focusing on the dreaded night trap as soon as I set foot on USS *Nimitz's* flight deck. According to the brief for LFS-1 (large force strike No. 1), my crew and I were to launch at 1100. We were to proceed directly to the Isabella tanker-track in the vicinity of the China Lake Ranges and take some fuel from Primo-82, an Air Force KC-10. After in-flight refueling, we would complete our mission, take another quick drink from the tanker, and proceed back to *Nimitz*. I then would make my best attempt at hurling my Grumman beast over the 1-wire but not past the 4-wire. That was the plan.

We were first to launch and first to arrive at the tanker. They immediately cleared us to "precontact." My ECMO-1, a second tour department head, who had more traps than I had hours, read through the in-flight-refueling checklist one last time. While in precontact, Primo-82 told us to standby while they retracted the refueling hose to troubleshoot. Two minutes later, the hose extended, and we were "cleared contact," with three knots maximum closure.

We had a beautiful sunny day, not a cloud in the sky, and nothing but smooth air. I only had tanked a handful of times since the fleet-replacement squadron (FRS), but I quickly had learned the KC-10 was the tanker of choice for any naval aviator because of its forgiving hose and large soft basket.

"This is beautiful, dude," my right-seater said just before my probe contacted the basket. Immediately upon contact, the basket seemed to explode. The neatly woven nylon and metal tubing instantly unraveled. Simultaneously, a sine wave rapidly traveled up the hose and rippled right back down.

As soon as I saw the basket begin to come apart, I immediately went to idle and squeezed the speed-brake switch as hard as I could, as if to make them come out faster than normal. Pieces of debris showered the air. As the sine wave reached the end of the hose, the remains of the refueling basket detached from it. The solid metal valve, which spewed fuel all over our aircraft at 50 psi, still was attached to the end of the hose. It began to violently whip up and down, beating relentlessly on the canopy and nose of the aircraft. Were we not in a jet that had an extremely thick, bulletproof canopy, the basket surely would have sliced through the glass, clearing out anything in its way.

The boom operator screamed over the radio, "Emergency disconnect! Emergency disconnect!" I could

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hear the fear in his voice, and it was obvious he had no control of his refueling system.

It took less than one second from contact to disengagement, but it felt like minutes had passed. As we slowed and descended, ECMO-2 said we were clear to the right side of the jet. I glanced at the engine instruments and was pleasantly surprised to see they both indicated normal, despite the meal of metal they just had ingested. As I tried to extract the seat-cushion from my colon, I cleared to the starboard side of Primo-82.

ECMO-1 pulled out his pocket checklist (PCL), flipped to the damaged-aircraft section, and told the two back-seaters to tighten down their lap belts. He also said to make sure their masks were on with visors down, because there was a chance we were going to eject. Our engine instruments indicated normal. However, the basket still was hanging from our mangled refueling probe. It was obvious to both of us in the front seat that our canopy had been damaged badly. Also, with the basket attached to our probe by a mere piece of nylon, we were certain that when the nylon gave way, the basket would be sucked down the starboard intake or come through the canopy.

We quickly pointed NH500 toward NAS China Lake and talked about the best way to land. If we made an arrested landing, the basket might fling off the end of the probe and get sucked down the intake. If we made a normal landing and the basket broke free on touchdown, several things might occur, and all with dire endings. The best idea we had was to take a trap and shut down the motors in the wires. One of the back-seaters was a Naval Test Pilot School graduate—he was intimately familiar with the airspace, specifically around NAS China Lake.

Despite the winds, we landed on the runway with short-field arresting gear, as recommended by the back-seater. The trap was uneventful, and the basket never left the probe. The field actually was closed, and no maintenance crews were at work. So, with the help of the emergency crew, we chocked our battered jet in the wires and walked away unscathed.

Our EA-6B suffered irreparable FOD damage to our starboard engine from the ingested metal. Our refueling

probe severely was mangled and required replacement. The nose radome suffered damage from the whipping hose and valve, and the carbon-fiber cover that protects the receivers in the vertical stabilizer had a hole through it. Fortunately, the canopy could be repaired. The KC-10 was forced to jettison the remains of their hose onto the desert floor, requiring replacement of the refueling hose and basket.

The investigation showed the refueling drogue had a catastrophic failure of the MA-4 coupler upon contact with the refueling probe. This contact caused the basket to detach from the refueling hose. The hose-reel-retract system, which they were troubleshooting when we arrived, wasn't working and caused the abnormal sine wave. The final cost of parts and man-hours topped $300,000. This was but a small price to pay in comparison to what could have happened had that small piece of nylon not held up in 280 knots of wind for the 30-mile divert to China Lake.

That night, while watching the sunset over China Lake and thanking God that our crew and our jet were safe on deck, I thought again about what the hinge had told me. I had experienced something crazy and exciting, didn't expect it, and now know what makes this job what it is. He couldn't have been more right. I didn't get the night trap that evening, but the exhilaration that took its place made an impact that I won't soon forget.

Lt. Barton flies with VAQ-135.

Decision Making
Assertiveness
Mission Analysis
Communication
Leadership
Adaptability/Flexibility
Situational Awareness

LAY DOWN THE LAW

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By Lt. Sean Stevens

As I studied to qualify as helicopter aircraft commander (HAC), I spent hours going over possible emergencies. I thought about a variety of engine failures, tail-rotor problems, icing, and more. If it was an emergency procedure (EP), I wanted to know how to deal with it. In all my studies, I never imagined a member of my crew, and a senior member at that, could quickly and unexpectedly put every member of my crew's lives at risk by a simple loss of situational awareness.


Photo by PHAN James R. Evans.

I qualified as HAC in the SH-60B in December 2005. My squadron deployed in March 2006, and three months later, I qualified as functional check pilot (FCP). I spent my first two months of deployment on board USS *Shoup* (DDG-86) and then transferred to USS *Abraham Lincoln* (CVN-72), so that another junior officer could gain "small deck" experience. This was my second deployment on the CVN, so I was familiar with the environment but was experiencing it for the first time as a HAC.

My first functional check flight (FCF) as a designated FCP was to be a B/C profile, following the removal and replacement of a failed stabilator actuator. I reviewed my checklist and made sure I got a good night's sleep before the 0430 brief.

My copilot was a new department head. A former FCP, he wanted to get familiar with the CVN environment before resuming his qualification. I included him in all pre-flight preparations and looked for signs

HSL-47, based at NAS North Island, is a nontraditional LAMPS Mk-III squadron that deploys as a squadron with a carrier strike group (CSG) aboard carriers, cruisers and destroyers.

to indicate whether our rank differences would negatively affect the flight.

After the NATOPS brief, the SDO relayed that the aircraft was not yet ready.

At 0900, the maintenance-control chief rushed into the ready room, and said, "701 is ready to go; you have to go now."

We grabbed our gear and headed up to the flight deck. Despite the sense of urgency, 701 wasn't yet spotted. We had to wait 10 minutes while the yellowshirts moved 701 to spot five. Once the aircraft was spotted, I preflighted as my copilot sat in the pilot seat to spread the rotor blades. When I strapped into the ATO's seat, my copilot said he had completed all prestart checklists and was ready for engine start. Because this flight was my first as an FCP, I wanted to go by the book—I didn't want to rush. I told him to wait as I reviewed the prestart checklist.

Once caught up with the prestart checklist, I proceeded with the engine-start/rotor-engagement checklists. Again, my copilot got ahead of me; obviously he was in a rush to get off the deck. When I told him we needed to slow down, I don't think he heard me.

All he said was "Dude! Dog is calling. We need to get off the deck."

I replied that I would not take off until we were ready. I then reviewed my checklist, completed the NAV SYNC, and was ready to launch. We had rushed to this point and had gotten out of sequence, but I was confident we were ready to launch. My copilot made the "up and ready" call, while I switched to steady on the position lights. He then called to go to "upper flashing," which does not come until after we lift. I wondered why he had made this call so soon until I realized he was starting to take off with the chocks and chains still attached. The launch crew also still was under the rotor arc.

I screamed "Down… down… down." But the pilot-at-the-controls (PAC) didn't hear me—I had selected ICS push-to-talk setting. The aircraft lifted about five feet, and I thought it would roll with only one chain attached.

We didn't roll, nor did we injure anyone under the aircraft. When we viewed the ILARTS tape after our near-mishap, we saw that the chock-runners had removed the chains a fraction of a second before the aircraft had lifted. When the PAC realized what he had done, he stabilized in a low hover to give the launch crew time to recover, and then he set down the aircraft.

Regardless of rank or experience, you may come to a point in your career where you'll need to
lay down the law.

Looking back on this event, I learned how to prevent a similar occurrence. First, use the ICS VOX setting. I don't know how many times I have heard someone say "Hot Mike!" when someone's VOX is set too sensitive. If I had had my VOX turned on, my copilot would have heard my warning. Don't rely on your presence-of-mind to key the mike in an emergency. Second, as PIC, guard the controls. I am now very sensitive to this procedure in all flight regimes, even on deck. Finally, despite differences in rank and experience, do not be complacent with any copilot. Be prepared to elevate your assertiveness when you are the PIC. Had I been more assertive, I could have set the tone in the cockpit, possibly preventing this event. As PIC, you have been placed in charge of the flight by the commanding officer. Regardless of rank or experience, you may come to a point in your career where you'll need to lay down the law.

I now take this experience with me every time I fly, and I feel safer as a result. I use the ICS VOX setting, guard the controls, and discuss any potential CRM issues as they arise. I know some pilots think it's a little too "touchy-feely" to talk about your crew dynamic in flight. If you are getting grouchy or frustrated, or your copilot is getting pushy, taking a little time to address the situation may be all that is needed to improve your CRM posture. Flying may not be more fun, but it will be safer.

Lt. Stevens flies with HSL-47.

Marine Captains Devin Smiley and David Szwed had to support a mission northeast of the town of Karmah, in the Al Anbar province. Their task was to conduct route reconnaissance. The time was 2010, and to get a better look at the roads, they decided to descend. As they began to descend, the pilot at the controls realized the collective would not go down without excessive force—it easily could be increased. A quick cockpit inspection revealed neither pilot was blocking the collective. To avoid exacerbating the situation, the crew decided to leave the collective at 60-to-65-percent torque and return to base.

The flight back to Al Taqqadum (TQ) was about 15 minutes and required a climb to 2,000 feet to deconflict their section from another flight working along the route. During the transit, the other helo was tasked with coordinating with base for a recovery effort and follow-on support for the mission. In the emergency aircraft, the rearseat pilot maintained the controls and avoided any collective increases, while the frontseat pilot handled communications. The section arrived at TQ, on final, at about 1,500 feet and 100 knots. They reached home field about 30 minutes after sunset but still barely pinkie time.

To bleed off the airspeed and establish a rate of descent on the back side of the power curve, the crew performed a right 360-degree turn. This yielded a 100-to-200-feet-per-minute (FPM) rate of descent. Any greater rate of descent required airspeeds less than 40 knots. As they approached midfield, the crew determined their rate of descent was insufficient and performed another 360-degree turn; this time, they turned left. When they rolled out from the turn, the aircraft was at about 200 feet AGL, at 40 to 50 knots, and with a 100-to-200 fpm rate of descent. This descent was maintained until the aircrew touched down at midfield. They slid onto the runway at 40 knots and stopped after a 100-yard slide. They had more than 4,000 feet of runway remaining.

The aircraft and aircrew were unscathed. After an inspection and some maintenance, the aircraft was returned to the schedule. The maintainers determined the collective had been stuck by the dust cover on the collective, which had rubbed against the metal airframe. After a short ride to the squadron in the fire truck, the aircrew manned another aircraft to complete the evening's flight schedule.

HMLA-369

From left, Capt. David Szwed and Capt. Devin Smiley.

Bravo Zulu

VT-2

Assigned as the runway duty officer (RDO) during evening flight ops, 2ndLt. Jeffrey Pullinger, USMC, prevented squadron aircraft from landing with animals on the runway. On three occasions, with an aircraft inside the 180, 2ndLt. Pullinger waved off landing traffic because of deer darting across the approach end of the runway. As naval aviation searches for deterrents for the bird-and-animal-strike-hazard (BASH) threat, nothing is more effective than a vigilant scan.

Allowable Tolerances

By Ltjg. Jacob M. Rose

Photo by MCS3 Ron Reeves. Modified.

I was at 27,000 feet, flying in close formation with our Ops O, as we flew through deteriorating weather over southern Iraq, en route to the central region. Six-hour missions were becoming routine for us at this point in the cruise, and this afternoon's flight was no different. However, that routine was broken when I heard, "Engine right. Engine right."

Following the engine warning, I brought back my right engine throttle to idle and checked my engine indications. Fortunately, it is for problems like this that we have two engines in the Hornet, and we're taught from day one the jet will continue to fly on one engine. As advertised, the jet flew just fine. My oil pressure indicated zero, and I had an oil-pressure caution on my left digital display. I told flight lead I was experiencing engine issues with my right motor. He immediately broke out the pocket checklist (PCL) and began to read through the emergency procedures with me.

We were no more than 100 miles into Iraq. Our primary divert in Southern Iraq was Ali Al Salem, Kuwait. We put that airfield on the nose and started to descend. My flight lead and I discussed shutting down the engine. Given my location, fuel state, and the fact the left motor still was operating properly, we decided to secure the engine. My flight lead passed me the lead as we descended into Kuwait. At this point, we needed to determine if it was worth trying to bring the jet back to the ship, USS *Ronald Reagan* (CVN-76), or to continue to Kuwait for an arrested landing.

After some discussion with the ship, we agreed I would take the jet into Kuwait, so a maintenance crew could be dispatched to fix it. I was relieved to hear I wouldn't have to try and land the plane single-engine on the ship. It wasn't the approach or the landing at the boat that concerned me; it was that I would have to dump down to below my bingo-fuel state to be light enough to recover on the ship. If I didn't make it aboard on the first pass, I then would be extremely low on fuel and would need to tank dirty with only one operating engine. That particular configuration would have made it very difficult to tank. In comparison, a single-engine landing on the beach would be a piece of cake, or so I thought.

About 30 miles from the field, my flight lead detached and headed back to the ship. Because of operational requirements, we needed to get his jet back so it could be turned around and sent back in-country later that day. Before detaching, he briefed me on the single-engine-landing procedures. We discussed aircraft-fuel weights and configurations, and he made sure the field-arresting gear was set up for my arrival. I now was on my own.

The weather was not great over Kuwait. However, the visibility was good enough to make out the field from around three to four miles. Of course, a few rain clouds and wind shear made things a little more interesting. I flew over the field and set up for an extended downwind, so I could configure the aircraft and adjust my fuel weight. I was on short final with everything suitcased, or so I thought.

At 600 feet AGL and two miles remaining on short final, I heard, "Engine left. Engine left."

All I can remember saying was, "This sucks."

I immediately looked down and saw I had an L FLAMEOUT caution, accompanied with a zero-oil-pressure reading on my left engine, but it still was operating. Considering the distance from the field, I continued my approach. My only operating engine continued to run, and I landed the plane on deck. I applied back-stick pressure as I approached the short-field arresting gear and shortly felt the comforting tug, indicating this flight finally was over.

So, what saved me here? First was good aircrew coordination with my flight lead. Next was sound decision-making. By most indications, my aircraft no longer had any operating engines. However, I reverted to the basics: Aviate, navigate and communicate. All I could think about was landing the plane on the runway two miles in front of me. Had I tried to troubleshoot the second engine problem or discuss this emergency with the tower, there is a good chance I would have flown a poor approach, possibly forcing a second approach—something I was unsure the jet could do.

A happy ending, right? The story is not quite finished.

Ali Al Salem is not equipped with Hornet maintenance support. The base there is shared by U.S. Air Force and Army personnel. Therefore, it proved to be a challenge to find qualified personnel to de-arm the aircraft.

My ordnance loadout that day consisted of a GBU-38 (500 pound JDAM), AGM-65 (Laser Maverick), and 500 rounds of 20-mm bullets: a standard OIF loadout.

The aircraft rested safely on the runway as the Air Force EOD personnel "attempted" to de-arm the Laser Maverick. Their lack of confidence with de-arming this particular missile should have been my first indication things were not going to be "standard" from that point on. I'm sure they had nothing but the best intentions in mind. However, I should have spoken up and asked the EOD personnel not to touch the aircraft if they had any doubt about how to de-arm the missile. The bottom line was I had signed for the aircraft, and, ultimately, I was responsible for its safe return.

It turns out during their attempt to de-arm the missile, they actually removed the restraining pin, which is used to lock the missile onto the launcher rail, preventing it from coming off during carrier arrestments. Over the course of the next two days, several maintenance personnel were helo'd into Ali Al Salem with parts in hand, ready to fix the jet and get me safely back to the ship.

While the maintainers worked on the aircraft, I tried to troubleshoot the Maverick to get it ready to fly back to the ship. I quickly realized the restraining pin was not relocking back into its initial position. I enlisted the help of the maintainers, and, together, we torqued on the bell-crank shaft in an effort to get the pin to seat correctly. I even called back to the ship and spoke with one of the ordnance personnel to make sure I had done everything correctly. This effort, however, led to one of my major mistakes. The initial doubt about whether the missile correctly was resecured to the launcher should have raised more red flags. "If there is doubt, then there is no doubt"—we brief this all the time in the Hornet community, especially when it comes to dealing with live ordnance.

Unfortunately, in trying to troubleshoot, I misinterpreted the allowable tolerances associated with reseating the restraining pin. How did I figure this out? As soon as I trapped the following day, the plane stopped, but the missile continued traveling forward until it skipped off the landing area and fell into the ocean directly in front of the ship.

No one was hurt. However, the big lesson learned here was, do not be the senior man with a secret. Although I was safe on deck after my engine issues, the flight was not over. I put my squadron and my skipper in a tight position without giving him the opportunity to ask questions. As soon as I noticed some irregularity with regard to the live ordnance on my aircraft, I immediately should have involved the maintenance officer (MO) or the skipper. I am confident they would have dispatched ordnance personnel to verify my troubleshooting. This breakdown in communication resulted in the loss of a valuable weapon—one that belongs on the wing of an FA-18C, not at the bottom of the Gulf.

Lt. Rose flies with VFA-25.

San Diego Shakedown

By Lt. Kyle Ashby

After 18 months of studying and training, I finally had achieved my aircraft-commander (AC) qualification. With this accomplishment came the opportunity to lead an aircrew on an overseas deployment. To prepare ourselves and the airplane, we detached to San Diego to conduct predeployment operational checks. The entire crew looked forward to a few sunny days away from rainy Whidbey Island and possibly some time on the beach when operations allowed. After four flights as the electronic-warfare aircraft commander (EWAC), I was getting comfortable in my new role and felt certain I could handle any malfunction in the EP-3.

Our second flight was scheduled for an easy seven-hour, day-operations check. The preflight was smooth, airspace had been coordinated, and we enjoyed typically sunny San Diego weather.

The crew was working well together. The 2P and I extensively had flown together during our last deployment, and our flight engineer had more than 3,000 hours and multiple FRS-instructor tours. Our takeoff was on time and uneventful. Everyone looked forward to landing by 1800 and enjoying the local attractions.

We didn't know we would return to base much sooner than planned. As we climbed straight ahead through 19,000 feet, the aircraft suddenly began to shake violently—far worse than any turbulence I ever had felt. The vibrations would last for about 15 to 20 seconds, and then subside for as long as a minute before starting again.

As the vibrations persisted, I asked our senior flight engineer if he ever had experienced anything similar in his decades of flying. He gave me a perplexed look and an emphatic, "No sir."

I realized I wasn't the seasoned AC I thought I was only an hour earlier. I directed the 2P to level off immediately so we could troubleshoot and correct the problem. I then solicited ideas and opinions from everyone on the crew, partly due to training and partly because I honestly had no idea what was causing the vibrations. After some discussion, we decided to pull each control-surface boost lever one at a time to bypass the hydraulic system in that flight-control system. If the vibrations stopped while we were boost-out in the elevator, aileron, or rudder, we could pinpoint our problem and leave that control surface unboosted. Unfortunately, the vibrations continued as we tried each control surface.

We then varied our speed to see if the vibrations were airspeed dependent. Again, no luck. The vibrations continued as they had before. While we were troubleshooting, I had been talking with the senior evaluator,

As the vibrations persisted, I asked our senior flight engineer if he ever had experienced anything similar in his decades of flying. He gave me a perplexed look and an emphatic, "No sir."

who was soliciting opinions and suggestions from our executive officer at homeplate through a comm relay.

I vaguely had recalled a hazrep that dealt with abnormal vibrations, and I remembered the vibrations were rudder related. Up to this point, our troubleshooting had taken about 30 minutes, and we weren't any closer to determining the cause of our problem. With no quick answer and the thought this problem might be rudder related, we decided to get the airplane on deck. We conducted slow flight checks on our RTB to ensure controllability at lower airspeeds wouldn't pose unexpected problems.

Controllability was normal throughout the check.

Because the source of our flight-control problem was uncertain, we decided to land immediately, rather than burn gas below our maximum landing weight. As I faced my first overweight landing, in an airplane with unexplained violent vibrations, it began to sink in that this flight had become anything but routine.

Our crew briefed the increased approach and landing speeds, calculated our landing ground-roll distance, and discussed the need for a low rate of descent on touchdown. The landing was uneventful, and everyone was more excited about being on the ground than we had been about going to the beach just five hours earlier.

Postflight inspection revealed an alarming situation. The bolts that hold the rudder bellcrank assembly to the rudder-torque tube were loose and approaching separation. This situation allowed the rudder to rapidly oscillate without any control inputs.

Good use of CRM facilitated our troubleshooting through an unusual malfunction and helped us decide that the best course of action was to land. This malfunction also reinforces the value of reading hazreps. As our EP-3 airframes continue to age and experience never-before-seen problems, hazreps are the most effective tool for disseminating this information to the fleet.

Lt.Ashby flies with VQ-2.

This is an exceptional example of how hazard reporting raises awareness, and allows us to make decisions that prevent mishaps.—Ed.

"He was a good instructor, and he wasn't afraid to admit to me that he'd made a mistake. I began to see that this aviation process is never an arrival at knowledge, but an ongoing journey. Everybody can and should continue to learn, from the beginning FAM-1 pilot to the most experienced veteran. The day held lessons I'll never forget."

–Lt. Steve McPherson reflecting on a flight in the training command. He currently flies with HSL-44.